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AN UNSUCCESSFUL EXPERIMENT IN ACCLIMATIZING GREY MULLET  
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by I. M. Kononov

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## FOREWORD

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# AN UNSUCCESSFUL EXPERIMENT IN ACCLIMATIZING GREY MULLET

- USSR -

Following is a translation of an article by I. M. Konovalov, head of the Laboratory of Fish Culture and Acclimatization of the Aral Ichthyological Division of the Zoological Institute of the Kazakh Academy of Sciences, taken from the Russian-language journal Rybnoye khozyaystvo (Fisheries), Vol. XXXV, No. 3, 1959, pages 20-22.

During the period 1954-1956 the Aral Sea was stocked with several hundred thousand young grey mullet (principally *Mugil auratus* Risso) from Bekovich Bay. Among these young fish were a certain number of small gobies or shrimp. Technical difficulties in sorting and requirements of excessive speed caused the Caspian gobies and shrimps to be released in the sea along with the young mullets. At the same time certain authors had recommended the use of small forms of Caspian gobies (of the genera *Knipowitschia* and *Hyrcanogobius*) and shrimps (*Leander*) as food fauna for the Aral Sea. This can also to a certain degree be explained by the fact that members of the expedition did not adhere too strictly to the problem of sorting the grey mullet shipped to the Aral Sea. (Note: Trudy soveshchanii po probleme akklimatizatsii ryb i kormovykh bespozvonochnykh /Proceedings of a Conference on the Acclimatization of Fish and Invertebrates Serving as Food/, published by the USSR Academy of Sciences, 1954.)

The live fish arriving from Krasnovodsk were ordinarily unloaded without delay onto special trucks fitted with canvas tanks and hauled out to the nearest parts of the sea. Frequently the young fish were released in Aral Bay. One time a small batch of young fish in well washed refrigerator sections with constant freshening of the water (by means of a pump) was released in Maloye Sea near the Tri Gorki (35-40 kilometers from the city of Aral'sk). More detailed information on the shipment of grey mullets from the Caspian to the Aral are cited in the memorandum by V. A. Mityushkin. (Note: V. A. Mityushkin, "Two-years of practice in moving young grey mullet from the Caspian to the Aral Sea," Rybnoye khozyaystvo, No. 10, 1956.)

On 2 June 1957 an angler for the first time caught an 11-centimeter goby (*Gobius melanostomus offinis* Eichwald) on a line in Aral Bay.

Somewhat later, between 20 June and 20 August, during an operation aimed at evaluating the rate of increase of young commercial fish, the author and a small group of co-workers from the Aral Ichthyological Division managed to catch a rather large number of Bubyр caucasicus Kowalewsky and Leander squilla in the shallow waters of the northwestern and eastern shores of Maloye Sea. Ordinarily the gobies occupied the shallowest community habitat. For instance, on 22 August along the shore where Aral Bay opens into the sea, more than 200 Bubyр caucasicus were caught in thick clumps of filamentous algae heavily coated with mazut by a single submergence of a basket for small fry while no other small fish of any kind were present. A big catch of gobies and shrimps was also observed on 22 August in Shaposhnikov Inlet (3 kilometers from Aral'sk). But here there were also a lot of other young fish, principally roach (*Rutilus*).

Let us mention that the bottom of Shaposhnikov Inlet is heavily silted and largely overgrown with aquatic plants, principally pondgrass (*Potamogeton pectinatus* L.).

The average size and weight of the bubyр in Shaposhnikov Inlet was as follows: length 18.7 millimeters with a fluctuation between 14 and 25 mm, and a weight of 87 milligrams with a fluctuation between 20 and 200 milligrams. In all cases there were a great number of young fish in the samples.

The shrimps had an average length of 25 millimeters and a weight of 280.6 milligrams (50 specimens). Young specimens predominated in each catch.

The southernmost occurrence of the gobies and shrimps, according to the results of our studies in 1957, was the eastern shoreline at Malyy Karabyub Gulf and the northwestern shoreline at Ushkul'.

At present we know that in May 1958 a scientist of the Aral Ichthyological Division, Ye. L. Markova, discovered many gobies and shrimps at the mouth of the Syr Dar'ya and in the last half of August, according to her data, shrimps were observed in huge numbers along the entire eastern shallow waters and in Kazakh-Dar'ya Gulf and Muynak Bay on the southern shore.

The gobies, according to Markova, managed to spread along the eastern shoreline to the locality of Balykchi-uzyak. We have no data on how both these species spread to the south.

The commercial sand goby (*G. melanostomus offinis*) was rather frequently hooked in Aral Bay in 1958 so apparently this species has also become successfully adapted here. An interpretation of small-fry-basket samples collected by Markova in 1958 will make it possible to determine accurately the habitat of the goby throughout the sea.

It is still difficult to answer the question as to what the fishing industry is to gain from this random acclimatization here

of Caspian gobies and shrimps. We still have too little data at present. We would have equal reason to eradicate or protect the small gobies (bubyr). On the one hand, they may turn out to be very useful inasmuch as at certain seasons when they descent to the greater depths they might serve as food for such valuable commercial fish as the pike perch, the asp (*Aspius aspius*) and the sturgeon. On the other hand, as benthos consumers the gobies are competitors of the majority of commercial fishes and their young. How great a danger this competition presents must be determined by future research.

The commercial importance of the sand goby (*G. Melanostomus offinis*) may increase many fold in the future, in connection with the deterioration of conditions for local fish in the Aral as the result of extensive hydraulic construction in the Syr Darya and Amu Darya River Basins.

The shrimps, from our point of view, are useful under all circumstances since, in the first place, they are very productive (Ye. N. Kudelina's data for the Caspian for 1950 show that *L. squilla* produces from 1,300 to 4,000 eggs or more per season) and, in the second place, their larva, which appear up to 7 times during the warm season and remain for more than a month suspended in the water, enrich the plankton.

The high nutritive value of the crustaceans, including the shrimps, for fish is indisputable since, in addition to the proteins and the necessary salts and vitamins, they contain a number of important amino acids. (Note: L. M. Obraztsov, Ye. A. Povshtiks and S. S. Drobysheva, "On the possibility of edible shrimp fisheries in Motovski Gulf", Nauchnotekhnicheskiy byulleten' PINRO /Scientific and Technical Bulletin of the Pacific Ocean Scientific Research Institute for Fisheries/ No. 2-3, 1957)

Yet at the very time that the gobies and shrimps, accidentally brought from the Caspian to the Aral, were becoming successfully acclimatized, the principal object of the acclimatization, the grey mullet, which had required so much work on the part of the members of the expedition during transportation, has apparently not survived in the Aral Sea. Neither the large-scale catches of 1957 nor those of 1958, which provided several tens of thousands of specimens for examination, brought up a single grey mullet. Commercial fishermen have likewise never seen one.

Once in the summer of 1956 a single 21-centimeter grey mullet was caught in the vicinity of the Bugun' fishing grounds. However we could not state that it was one of the group of fish which had survived the winter since in the spring of that year another batch of grey mullet had been shipped in.

The cause of the death of the grey mullet could be that it could not find sites with the right temperature for wintering

(in the Aral Sea in the winter the bottom temperature is  $0.3 - 0.5^{\circ}$  at depths of up to 20 meters.)

The unsuccessful experiment in acclimatizing the grey mullet in the Aral Sea and the unexpected adaptation in this body of water of the goby and shrimp shows that this work must be done more carefully with consideration given to the peculiarities of the fish being acclimatized and the natural conditions of the new body of water.

If it were to be judged practical to repeat the experiment of acclimatizing the grey mullet in the Aral Sea we think it would be more reasonable to move the fish by helicopter and release them in the southern part of the sea.

In addition we believe it possible to introduce the grey mullet into the Aral Sea in the form of fertilized eggs. In this connection it might be useful to subject the eggs to low temperatures at a certain stage of development in order to alter the natural characteristics of the progeny toward greater resistance to cold.

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